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Application No.: 10/630,642

Docket No.: JCLA8556-D

REMARKS**Present Status of the Application**

It is noted with great appreciation that the Office has considered claims 22-27 as allowed and claims 16-19 as allowable. However, the Office has rejected claims 14, 15, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Lebowitz (US 4,694,561).

After carefully considering the remarks set forth in this Office Action and the cited references, Applicants respectfully submit that the presently pending claims are in condition for allowance. Reconsideration and withdrawal of the Examiner's rejection are requested.

Response to 35 U.S.C. 103 rejection

Claims 14-15 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art (APAF) in view of Lebowitz (US 4,695,561).

To establish a prima facie case of obviousness under 35 U.S.C. § 103(a), the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. Further, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. § 2143, 8th, February 2003. Applicants respectfully submit that Lebowitz is legally deficient for the purpose of rendering claim 14 unpatentable.

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Applicants respectfully submit that APA in view of Lebowitz is legally deficient for the purpose of rendering claim 14 unpatentable because Lebowitz fails to provide suggestion or motivation to combine APA in such a manner recited in the claimed invention.

The present invention, as basically recited in claim 14, at least teaches '....removing a portion of the first type ion-doped well to form at least one first opening without exposing the first type ion-doped buried layer; and forming a second type ion-doped region in the first type ion-doped well at the bottom of the first opening'.

The Office Action alleges that APA does disclose removing a portion of the first type ion doped well to form at least one first opening as required by the present claims. The Office Action further alleges that Lebowitz teaches a trench capacitor and is thus obvious to one of ordinary skill in the art to modify the variable capacitor as disclosed by APA by forming the capacitor in the bottom of an opening as taught by Lebowitz. Applicants respectfully disagree the contention of the Office Action and further submit that the Lebowitz lacks of motivation to combine with APA.

The present invention teaches a variable capacitor having a second type ion-doped region 120 formed at the bottom of an opening, so that the thickness from the second type ion-doped region to a first type ion-doped buried layer is reduced. Ultimately, overall resistance of the variable capacitor decreases considerably.

Lebowitz relates to a method for fabricating a capacitor of DRAM in a trench formed in a substrate. By using a trench configuration, area of a capacitor can be expanded without increasing the area of the wafer needed to form the capacitor, and this is exactly what Lebowitz

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teaches in col. 1, ln 30-65. In other words, Lebowitz simply teaches forming a capacitor in a trench and the components of the capacitor includes a bottom electrode, a dielectric layer and an upper electrode. However, APA does not teach a trench capacitor. APA discloses a variable capacitor and the variable capacitor includes an N^+ buried layer above the substrate, an N -well and a deep collector region above the buried layer and a field oxide layer above the substrate. The field and the components of Lebowitz are absolutely different from those of APA, so that there is no suggestion or motivation to one of ordinary skill in the art to combine Lebowitz with APA in a manner recited in the claimed invention.

Further, the purpose of the present invention is to decrease overall resistance of the variable capacitor. However, in Lebowitz, the purpose of forming the trench is to expand area of a capacitor without increasing the area of the wafer. Lebowitz does not teach that forming the trench can be used for variable capacitor to decrease overall resistance. The demand of APA is not on expanding area of a capacitor, so that there is no suggestion or motivation to one of ordinary skill in the art to combine Lebowitz with APA in a manner resulting in the claimed invention.

On the other hand, in the Lebowitz reference, the opening/trench has the dielectric layer and the upper electrode formed therein. The components of the Lebowitz reference are absolutely different from those of APA. Therefore, when the Lebowitz reference is combined with APA, the opening/trench and each components of variable capacitor have various combinations. According the Lebowitz reference, the most possibility is that there are some components of variable capacitor are formed in the opening/trench. However, no part of the capacitor of the

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invention is formed inside the opening/trench 118. In fact, all parts of the capacitor of the invention, including the second type-ion doped region as shown in Figure 1D, are formed outside of the opening/trench 118. The forming of the opening/trench 118 in the well in the instant case is to reduce the thickness from the second type-ion doped region to the first type ion-doped buried layer. There is neither any explicit teaching nor implicit suggestion in neither APA nor Lebowitz that a doped region is to be formed at the bottom of an opening in the first type ion-doped well such that the distance from the doped region to the buried layer can be reduced.

Therefore, not only the motivation to modify or to combine APA with Lebowitz is lacked. Even if APA is combined with Lebowitz, the alleged combination still fails to teach or suggest the claimed invention. Accordingly, the withdrawal of the rejection and the allowance of claim 14 are earnestly requested. Because claims 15 and 21-22 are dependent upon claim 14, the same reasons as discussed above also apply to these claims.

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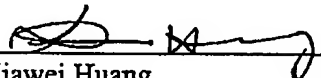
CONCLUSION

For at least the foregoing reasons, it is believed that the presently pending claims 14-27 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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